

O-T-236
MARCH 21, 1945

FEDERAL STANDARD STOCK CATALOG

Section IV

(Part 5)

FEDERAL SPECIFICATION

FOR

TETRACHLORETHYLENE (PERCHLORETHYLENE); TECHNICAL-GRADE

This specification was approved on the above date by the Director of Procurement, for the use of all departments and establishments of the Government, and shall become effective not later than June 1, 1945. It may be put into effect, however, at any earlier date after promulgation.

A. APPLICABLE SPECIFICATION.

A-1. The following Federal specification of the issue in effect on date of invitation for bids shall form a part of this specification:

VV-L-791—Lubricants and Liquid Fuels; General Specifications (Methods for Sampling and Testing).

B. GRADE.

B-1. Tetrachlorethylene, as specified herein, shall be furnished in one grade (See Note I-2).

C. MATERIAL.

C-1. Tetrachlorethylene shall be suitable for the purposes intended and as specified hereinafter.

D. GENERAL REQUIREMENTS.

D-1. See section E.

E. DETAIL REQUIREMENTS.

E-1. *Appearance.*—Tetrachlorethylene shall be clear, and free from suspended matter or sediment.

E-2. *Color.*—The color shall be not darker than a solution containing 0.0045 gm. potassium dichromate in one liter of distilled water.

E-3. *Odor.*—The odor shall be characteristic; and the tetrachlorethylene shall leave no residual odor after drying from filter paper (see paragraph F-2c).

E-4. *Specific gravity.*—Shall be not less than 1.615 nor more than 1.630 at 20°/20° C.

E-5. *Nonvolatile matter (105° to 110° C.).*—Shall be not more than 0.016 gm. per 100 ml. of sample.

E-6. *Spot test.*—Shall pass the spot test described in paragraph F-2f.

E-7. *Hydrogen ion concentration.*—Shall pass the test described in paragraph F-2g.

633712—45—(no. 111)

THIS DOCUMENT CONTAINS 6 PAGES.

TechLaw, Inc.

E-8. *Water content*.—Shall pass the test described in paragraph F-2h.

E-9. *Distillation range*.—

Initial boiling point..... Not below 118° C.
End point..... Not above 124° C.

E-10. *Copper corrosion*.—Shall pass the test described in paragraph F-2j.

E-11. *Free chlorine*.—Shall pass the test described in paragraph F-2k.

E-12. *Flash point*.—Shall not flash below or at the boiling point when tested in accordance with paragraph F-2l.

F. METHODS OF SAMPLING, INSPECTION, AND TESTS.

F-1. *Sampling*.—A representative composite sample shall be taken from each delivery and sent to the laboratory for test. The sample shall be not less than 2 quarts nor more than 2 gallons.

F-2. *Laboratory examination and tests*.—

F-2a. *Appearance*.—Pour some of the thoroughly mixed sample into a test tube. Allow to stand for at least 10 minutes at room temperature (20° to 30° C.). Examine by transmitted light for clarity, suspended matter, and sediment.

F-2b. *Color*.—Prepare a standard solution of 0.0045 gm. of potassium dichromate per liter of distilled water. Compare the colors of the sample with that of the standard solution in 50 ml. Nessler tubes.

F-2c. *Odor*.—Note the odor of the material. Dip strips of No. 40 Whatman-type filter paper of uniform shape and size into the sample. Remove and allow to dry for 2 hours in a well-ventilated room at 20° to 30° C. There shall be no residual odor at the end of the drying period.

F-2d. *Specific gravity*.—Determine at the specified temperature by any convenient method.

F-2e. *Nonvolatile matter (105° to 110° C.)*.—Place 100 ml. of the sample in a tared porcelain evaporating dish. Evaporate over a steam bath practically to dryness. Heat in an oven at 105° to 110° C. to constant weight. Report the weight of the residue as grams per 100 ml. tetrachlorethylene.

F-2f. *Spot test*.—Place 5 drops of tetrachlorethylene in the center of a No. 40 Whatman-type filter paper. The center portion of the under surface of the filter paper shall not be in contact with any object. Allow the material to evaporate in a well-ventilated room, away from direct sunlight, at room temperature (20° to 30° C.). There shall be no stain or spot after a 2-hour drying period.

F-2g. *Hydrogen ion concentration*.—Place 100 ml. of the sample into a 250 ml. separatory funnel. Add 25 ml. of freshly boiled and cooled distilled water. Stopper and shake vigorously for 2 minutes. Let stand until there is a separation of layers. Pipette off 5 ml. of the aqueous layer (top layer) and determine its pH value at 25° C. using a glass electrode pH meter. The hydrogen ion concentration shall be not greater than that indicated by a pH of 5.0.

F-2h. *Water content*.—Place a portion of the sample in a test tube and tightly stopper. Cool contents to 0° C. and maintain at this temperature for 10 minutes. Examine the cooled sample by transmitted light. The material shall be clear and show no turbidity.

F-2i. *Distillation range*.—Determine the distillation range in accordance with method 100.1 (Distillation of Gasoline, etc.) of Federal

FEDERAL STANDARD STOCK CATALOG
(Section IV, Part 5)

O-T-236-3
(Mar. 1945)

Specification VV-L-791, except that the thermometer shall be in accordance with A. S. T. M. partial immersion thermometer E1 (1C-39), -20° to 150° C. of Method 950.1 (A. S. T. M. Standard Thermometers).

F-2j. *Copper corrosion.*—Place a clean strip of mechanically polished pure sheet copper, about $\frac{1}{2}$ inch wide and 3 inches long, in a glass tube about $\frac{3}{4}$ inch in diameter and 18 inches long. Add sufficient of the sample to completely cover the strip and heat rapidly to boiling (the use of an oil or other suitable bath maintained at a temperature slightly higher than the initial boiling point of the tetrachlorethylene is desirable). Maintain at this point for 30 minutes without actual distillation taking place. Examine copper strip after the boiling period for discoloration. Marked blackening or iridescence (a slight tarnish shall be disregarded) of the copper strip shall be considered as not conforming to the requirements of this specification.

F-2k. *Free chlorine.*—Place 25 ml. of the sample in a 250 ml. Erlenmeyer flask. Add 25 ml. of a 10-percent aqueous KI solution containing 0.25 ml. of starch indicator solution (see paragraph F-2k (1)). Shake well. The aqueous layer shall be no darker than a 10-percent KI solution with starch indicator as above.

F-2k (1). *Starch indicator solution.*—Mix about 2 gm. of reagent grade soluble starch or potato starch with sufficient cold water to form a thin paste. Transfer to 1 liter of boiling water, add 1 gm. of salicylic acid, and boil until the solution is clear. Cool and transfer to a glass-stoppered bottle.

F-2l. *Flash point.*—Determine the flash point in accordance with method 110.3 (flash point by means of the open cup tester) of Federal Specification VV-L-791.

G. PACKAGING, PACKING, AND MARKING FOR SHIPMENT.

G-1. *Packaging.*—Unless otherwise specified, commercial packages are acceptable under this specification.

G-2. *Packing.*—Unless otherwise specified, the subject commodity shall be packed in substantial commercial containers of the type, size, and kind commonly used for the purpose, so constructed as to insure acceptance and safe delivery by common or other carriers, at the lowest rate to the point of delivery called for in the contract or purchase order.

G-3. *Marking.*—

G-3a. *Issue packages.*—Unless otherwise specified, each package shall be marked with the name of the material and the quantity contained therein, and the name of the manufacturer or contractor. The following statement with a "Caution" label shall appear prominently on each package:

Volatile Solvent
Use With Adequate Ventilation
Avoid Prolonged Breathing
of Vapor.

G-3b. *Shipping containers.*—Unless otherwise specified, shipping containers shall be marked with the name of the material and the quantity contained therein, as defined by the contract or order under which the shipment is made, the name of the contractor, and the number of the contract or order.

H. REQUIREMENTS APPLICABLE TO INDIVIDUAL DEPARTMENTS.

H-1. The following departmental specifications, of the issue in effect on date of invitation for bids, and special requirements, shall form a part of this specification, and shall be applicable to purchases made under this specification by the respective departments.

H-2. *Army.*—U. S. Army Specifications No. 100-2 Standard Specification for Marking Shipments, copies of which may be obtained by prospective bidders, without cost, upon application to the distributing agency indicated in the invitation for bids.

H-3. *Navy.*—

H-3a. *Navy Department specifications.*—

General Specifications for Inspection of Material.

39P16—General Specification for Packaging and Packing for Overseas Shipment:

Section VI—Boxes, Wood, Nailed.

Section VII—Boxes, Wood, Wire-Bound.

Section X—Drums; Metal, 55-Gallon (for other than Petroleum Products).

Section XXIV—Cans and Pails, Metal.

Copies of the above-referred-to specifications may be obtained without cost upon application to the Bureau of Supplies and Accounts, Navy Department, Washington 25, D. C., except that Naval activities should make application to the Supply Officer in Command, Naval Supply Depot, Bayonne, N. J.

Copies of the Navy Shipment Marking Handbook may be obtained by Naval activities and others upon application to the Bureau of Supplies and Accounts.

H-3b. *Packaging.*—

H-3b (1). *For domestic shipment.*—Unless otherwise specified, perchlorethylene shall be furnished in 5-gallon square cans, 5-gallon closed top steel containers, or in 55-gallon steel drums as specified in the contractor order. (See paragraph H-2.)

H-3b (1)a. Five-gallon cans shall conform to the requirements of Navy Department Specification 39P16, Section XXIV, except that 107-pound basis weight plate may be used and no exterior protective coatings will be required.

H-3b (1)b. Five-gallon closed top steel pails shall conform to the requirements of Navy Department Specification 39P16, Section XXIV.

H-3b (1)c. Fifty-five-gallon steel drums shall be made of 0.0478-inch \pm 0.005 inch steel (18 gage), and shall conform to the requirements of Navy Department Specification 39P16, Section X.

H-3b (2). *For overseas shipment.*—Unless otherwise specified, perchlorethylene shall be furnished in 5-gallon closed top steel containers or 55-gallon steel drums, as specified in paragraphs H-3b (1)b and H-3b (1)c.

H-3c. *Packing.*—

H-3c (1). *For domestic shipment.*—

H-3c (1)a. Unless otherwise specified, two 5-gallon square cans shall be packed in a nailed wood box or wirebound box, conforming to the requirements of Navy Department Specification 39P16, Sections VI and VII, respectively. No strapping will be required.

FEDERAL STANDARD STOCK CATALOG
(Section IV, Part 5)

O-T-236-5
(Mar. 1945)

H-3c (1)h. Five-gallon steel pails and 55-gallon steel drums specified in paragraphs H-3b (1)b and H-3b (1)c will require no overpacking.

H-3c (2). *For overseas shipment.*—Unless otherwise specified, 5-gallon steel pails and 55-gallon steel drums specified in paragraph H-3b (1)b and H-3b (1)c will require no overpacking.

H-3d. *Marking.*—

H-3d (1). *Five-gallon square cans.*—Unless otherwise specified, 5-gallon square cans shall be plainly marked with the following information completed:

MATERIAL -----
Type -----
QUANTITY -----
CONTRACTOR -----
CONTRACT NO. -----

H-3d (2). *Five-gallon steel pails, 55-gallon steel drums and shipping containers.*—Unless otherwise specified, 5-gallon steel pails, 55-gallon steel drums and shipping containers for 5-gallon square cans shall be plainly marked with the following information completed:

MATERIAL -----
Type -----
QUANTITY -----
CONTRACTOR -----
CONTRACT NO. -----
GROSS WEIGHT -----

In addition to the foregoing, marking shall conform to the requirements of the latest issue of the Navy Shipment Marking Handbook.

I. NOTES.

I-1. Purchasers should exercise any desired options offered herein.

I-2. Tetrachlorethylene as covered by this specification is a technical grade intended for dry cleaning and general use as a solvent and for use in the vapor degreasing of metals.

I-3. Tetrachlorethylene should be used with caution and in well ventilated rooms.

I-4. It is believed that this specification adequately describes the characteristics necessary to secure the desired material, and that normally no sample will be necessary prior to award to determine compliance with this specification. If, for any particular purpose, samples with bids are necessary they should be specifically asked for in the invitation for bids, and the particular purpose to be served by the bid sample should be definitely stated, the specification to apply in all other respects.

I-5. Federal specifications do not include all types, classes, grades, sizes, etc., of the commodities indicated by the titles of the specifications, or which are commercially available but are intended to cover the types, etc., which are suitable for Federal Government requirements.

I-6. An Index of Federal Specifications, and also a Quarterly Supplement Index of Emergency Alternate Federal Specifications, may be purchased as noted in the paragraph next below, price to be obtained from the Superintendent of Documents.

O-T-236-6
(Mar. 1945)

FEDERAL STANDARD STOCK CATALOG
(Section IV, Part 5)

I-7. Copies of this specification and of VV-L-791b may be obtained upon application, accompanied by money order, coupon, or cash to Superintendent of Documents, Government Printing Office, Washington, D. C. Price of this specification, 5 cents. Price on VV-L-791b, 25 cents.

Notice.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

U. S. GOVERNMENT PRINTING OFFICE: 1945

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 5 cents

O-T-236

AMENDMENT-2
JUNE 8, 1951SUPERSEDING
AMENDMENT-1
7 October 1949

FEDERAL STANDARD STOCK CATALOG

Section IV

(Part 5)

FEDERAL SPECIFICATION

FOR

TETRACHLORETHYLENE (PERCHLORETHYLENE); TECHNICAL-GRADE

This amendment was approved on the above date by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

The following changes shall be made in Federal Specification O-T-236, dated 21 March 1945:

Page O-T-236-3:

Paragraph G-3a:

Line 3. Following "manufacturer or contractor.", delete remainder of paragraph and substitute "In addition, each individual container shall bear the following "Caution" label printed in bold type and securely affixed to the container:

"WARNING! VAPOR HARMFUL.

Use only with adequate ventilation.

Avoid prolonged or repeated breathing of vapor.

Avoid prolonged or repeated contact with skin.

Do not take internally."

Pages O-T-236-4 and 5:

Paragraphs H-2 through H-3d (2). Delete in their entirety and substitute paragraphs H-2 through H-2e as follows:

H-2. *Army, Navy, and Air Force.*—

H-2a. *Applicable Specifications.*—

Military Specifications:

JAN-P-110—Packaging and Packing for Overseas Shipment—Drums; Metal, 55-gallon (for Other than Petroleum Products).

JAN-P-124—Packaging and Packing for Overseas Shipment—Containers (Cans, Pails and Drums), Metal (for Other than Subsistence Items).

900576—51—(No. 346)

U. S. Army Specifications:

94-40645—Marking; Exterior, Domestic and Export Shipment, by Contractors.¹

100-2—Standard Specification for Marking Shipments by Contractors.²

Navy Department Specification:

General Specifications for Inspection of Material.³

Bureau of Supplies and Accounts Publication:

Navy Shipment Marking Handbook.³

(Copies of specifications required for Army purchases may be obtained from the procuring agency. Both the title and identifying symbol or number should be stipulated when requesting copies.)

(Copies of Federal and Military specifications required for Navy purchases, Navy Department specifications, and the Navy Shipment Marking Handbook may be obtained without cost upon application to the Bureau of Supplies and Accounts, Navy Department, Washington 25, D. C., except that Naval activities should make application to the Commanding Officer, Naval Supply Depot, Scotia 2, N. Y. Both the title and identifying symbol or number should be stipulated when requesting copies.)

(Copies of specifications required for Air Force purchases may be obtained from the Commanding General, Air Materiel Command, Wright-Patterson Air Force Base, Dayton 1, Ohio.)

H-2b. *Packaging.*—Perchloroethylene dry cleaning solvent shall be packaged in 5-gallon closed-top steel containers or 55-gallon steel drums, as specified.

H-2b (1). Five-gallon closed-top steel containers shall conform to the requirements of Military Specification JAN-P-124, type V. Nominal metal thickness shall be not less than 24-gage for Army and Navy, and 22-gage for Air Force shipments.

H-2b (2). Fifty-five-gallon-capacity steel drums shall conform to the requirements of Military Specification JAN-P-110, table I. Nominal metal thickness shall be not less than 18-gage for Army and Navy, and 16-gage for Air Force shipments.

H-2c. *Packing for domestic and overseas shipment.*—Overpacking will not be required.

H-2d. *Marking.*—Metal containers shall be durably and legibly marked on the main panel of the body, and on the head, by lithographing, stenciling, or hand-stamping with a noncorrosive, water-resistant, waterproof ink, which will not smear or rub off during handling.

H-2d (1). *Army.*—Marking shall conform to the requirements of U. S. Army Specification 100-2. Label information shall be as specified in the contract or order.

H-2d (2). *Navy.*—In addition to any special marking required by the contract or order, marking of interior packages and shipping containers shall be in accordance with the requirements of the Navy Shipment Marking Handbook.

¹ Applicable only to Air Force purchases.

² Applicable only to Army purchases.

³ Applicable only to Navy purchases.

FEDERAL STANDARD STOCK CATALOG
(Section IV, Part 5)

O-T-236
Amend.-2-3
(June 1951)

H-2d (3). *Air Force*.—Marking shall conform to the requirements of U. S. Army Specification 94-40645. Label information shall be as specified in the contract or order.

H-2e. *Ordering information*.—Requests, requisitions, schedules, and contracts or orders should specify whether the subject commodity is to be packed and shipping containers marked for domestic or overseas shipment. (See pars. H-2c and H-2d.)